SANKALCHAND PATEL UNIVERSITY ।। अथातो ज्ञानजिज्ञासा ।।	**FACULTY OF COMPUTER SCIENCE** **Master Of Computer Application (Sem-III)** In Effect from Academic Year 2023-24

Branch Name:	MCA
Program Code:	CS201
Course Name:	**Advanced Networking Practical**
Course Code:	3CS2010305P
Pre-requisite Course:	Digital Data communication concepts, Layered architecture as per OSI and TCP/IP model, Functionality of all layers in the OSI and TCP/IP model, Concepts of LAN, WAN, Internet, HTTP, Ethernet, General concepts in routing and basic routing algorithms like Djkistra's shortest path, distance vector routing, link state routing, etc., Overview of popular application layer services like HTTP, DNS, FTP etc

Course Objective:

1. Develop strong analysis, design, implementation; testing and troubleshooting skills in students regarding TCP/IP based networks and services as relevant to the computer networking needs of the IT industry.
2. Establish a strong conceptual foundation of the TCP/IP protocol stack, services and related tools/technologies so as to facilitate the development of the above-mentioned skills.
3. Design and implement customized TCP/IP based application layer services.
4. Familiarize with security and performance issues in TCP/IP networks.
5. Familiarize with Wireless Networks, WiFi and Mobile Networks, Browser Networking, XML Http Request and Server-Sent Events (SSE) and WebSocket and WebRTC
6. Create a strong conceptual foundation and offer maximum possible development of required theoretical and practical skills for students aspiring to make a career in Computer Networking Like Network Designer, Network administrator, etc.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total
3	-	-	3	-	-	25	25	50

List of Experiments:

Note: The experiment list provided for reference only. The course teacher may Change/formulate it as per his/her methodology and requirement.

Sr.No	Practical Experiments
1.	Download Wire shark is a network packet analyzer from its official webpage https://www.wireshark.org/
2.	Install Wire shark under Windows/Linux platform, Windows installer names contain the platform and version. Install Win Pcap
3.	Analyze Internet Protocol (IPv4/IPv6) Traffic Normal IPv4 Traffic, IPv4 Problems, IPv4 Packet Structure, IPv6 Traffic, Dissect the IPv6 Packet Structure, IPv6 Addressing, Filter on IPv4Traffic, Filter on IPv6 Traffic
4	Analyze Address Resolution Protocol (ARP) Traffic Normal ARP Requests/Responses, Gratuitous ARPs, ARP Problems, Dissect the ARP Packet Structure, Filter on ARP Traffic

5	Analyze User Datagram Protocol (UDP) Traffic Normal UDP Traffic, UDP Problems, Dissect the UDP Packet Structure, Filter on UDP Traffic
6	Analyze Transmission Control Protocol (TCP) Traffic Established of TCP Connections, Termination of TCP Connections, How TCP Tracks Packets Sequentially, Review the Trace File: Packet Loss Detected by the Receiver – Fast Recovery, Packet Loss Detected by the Sender – RTO Timeout, Improve Packet Loss recovery with Selective Acknowledgments, TCP Flow Control, The TCP Window Size > Zero Can Still Stop Data Transfer.
7	Analyze Hypertext Transfer Protocol (HTTP) Traffic Normal HTTP Communications, HTTP Problems, Dissect HTTP Packet Structures, Display HTTP Statistics, Graph HTTP Traffic Flows, Set HTTP Preferences, Analyze HTTPS Communications, Analyze SSL/TLS Handshake
8	Analyze File Transfer Protocol (FTP) Traffic Normal FTP Communications, FTP Problems, Dissect the FTP Packet Structure, Filter on FTP Traffic
9	Analyze Email Traffic Normal POP Communications, POP Problems, Dissect the POP Packet Structure, Filter on POP Traffic, Normal SMTP Communications, SMTP Problems, Dissect the SMTP Packet Structure, Filter on SMTP Traffic
10	Analyze IEEE 802.11 (WLAN) Wireless LANs (WLANs) Traffic, Signal Strength and Interference, Capture WLAN Traffic, Monitor Mode vs. Promiscuous Mode, 802.11 Traffic Basics like Data Frame, Management Frame and Control Frames etc., Normal 802.11Communications, Dissect the 802.11 Frame Structure, Filter on All WLAN Traffic Frame Control Types and Subtypes
11	Analyze Dynamic Host Configuration Protocol (DHCPv4/DHCPv6) Traffic

Text Books:

1. Computer Network- Andrew S. Tanenbaum, Fifth edition, Pearson.

References Books:

1. Ilya Grigorik, “High-Performance Browser Networking”, 2013: First Edition, O’Reilly
2. Douglas E. Comer, “Internetworking with TCP/IP - (Vol. 1) Principles, Protocols, and Architecture”, 6thEdition, Prentice Hall of India (PHI) Publishers.
3. Behrouz A. Forouzan, “TCP/IP Protocol Suite”, 4th Edition, McGraw-Hill
4. W. Richard Stevens, G. Gabrani, “TCP/IP- Illustrated, Vol. 1 (The Protocols)”, Pearson Publishers.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom’s Taxonomy Level
CLO1	To have a thorough **understanding** of TCP/IP based systems, services and related tools and technologies.	1 Remembering 2 Understanding
CLO2	To be fluent **in design and developing** Java based TCP/IP socket-based networking solutions.	3 Applying,
CLO3	To **Effectively** use available OS commands/utilities as well as popular third-party **tools** for TCP/IP networking depending upon the needs.	2 Understanding 4 Analyzing
CLO4	To geared to **adapt** to more sophisticate networking related packages in Java and hence develop relatively complex **Applications** more reliably and faster.	6 Creating
CLO5	To **Understanding** the Wireless Network, Browser Networking, Web socket and web RTC	2 Understanding
CLO6	**Learn** about varies networking technology for **solve** problem in networking	4 Analyzing

Mapping of CLOs with Pos & PSOs

Course Learning Out comes	Program Outcomes(POs)												Program Specific Out comes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CLO1		M			L	M	M		H	L	M		M	M
CLO2	M	M	H		M		M	L	H		M		H	M
CLO3		M		M	H		H		M	M	M	M	M	M
CLO4	L	M	M		M		H	L	H		M	H	M	H
CLO5	M		M	L		M			L	M			M	M
CLO6		M	L		L			M				M	M	M

H:High, M:Medium, L:Low